PROTECTED B

For information

UPDATE ON THE USE OF PREDICTIVE ANALYTICS IN PRE-ARRIVAL RISK ASSESSEMENT

For the President

PURPOSE

This briefing note updates you on the work underway to develop a predictive analytics model for pre-arrival risk assessment in the traveller stream. You were previously provided an update on this work in August 2014 (see Attachment 1).

ISSUE

BACKGROUND

STATUS

Work continues between the Science and Engineering Directorate (SED) and the Enterprise Data Warehouse Directorate of the Information, Science and Technology Branch and the business owners in Traveller Programs Directorate of the Programs Branch to try and find a solution to the current stalemate.

NEXT STEPS

If the data sets are successfully matched, the following are the steps will be undertaken to implement predictive analytics modelling on pre-arrival data:

- Finalize understanding of data elements and the structure of the data to develop a predictive analytic model;

- Apply an initial predictive model to the data and conduct analysis within two months of the completion of the development of a predictive analytics model;

- Prepare a preliminary report on the outcome of the application of the predictive analytics model to the data one month after the development of the predictive analytics model; and

- Leverage report to validate existing scenarios or to develop new scenarios for traveller targeting, three months after the report becomes available.

Richard Wex, Vice-President
Programs Branch

ATTACHMENT

1. Status Update – Predictive Analytics – October 2014 – CCM 14-01630

Canada Border Services Agency | Agence des services frontaliers du Canada

PROTECTED B

For information

UPDATE ON THE USE OF PREDICTIVE ANALYTICS IN PRE-ARRIVAL RISK ASSESSEMENT

For the President

This is good news. I'm really keen to see this work progress, not as a replacement for [illegible] element but at the forefront of our future capabilities. I think the potential is huge! 2014.10.03

PURPOSE

To provide you with an update on the work that has been undertaken for the development of predictive analytics methods in pre-arrival risk assessment for the traveller stream.

ISSUE

BACKGROUND

The Canada Border Services Agency (CBSA) is developing automated predictive analytics methods that will improve risk assessment by analyzing large volumes of data for trends and patterns that might otherwise go unnoticed. Predictive analytics involve using advanced techniques that allow automated prediction based on machine learning, with limited human intervention, to detect faint patterns of relationships in large and complex data sets. As the analysis does not start with a specific hypothesis (e.g. travellers from a particular country are higher risk), the algorithms may identify trends that would not otherwise be apparent. In terms of border control, calculations can be performed on historical data to predict the relative probability of particular outcomes (e.g. resultant targets) from new data on incoming travellers and shipments.

In May 2014, a briefing note entitled "Use of Predictive Analytics in Pre-Arrival Risk Assessment" was provided to you, detailing the work required to pilot a predictive analytics tool (see attachment 1). As specified in the previous briefing note, current efforts are focused on the traveller stream and will align with the full implementation of scenario-based targeting. Work on predictive analytics is a coordinated, multi-branch endeavour involving the Science and Engineering Directorate of the Information, Science and Technology Branch, the National Border Operations Centre Directorate of the Operations Branch, and the Traveller Program and Enforcement and Intelligence Programs Directorates of the Programs Branch.

Canada

STATUS

As outlined in the initial May 2014 briefing note, there are five milestone activities that are integral to the implementation of predictive analytics technology:

1. Finalize the understanding of data elements and the structure of the data to develop a predictive model.
2.
3. Apply a predictive model to the data and conduct analysis.
4. Develop a report based on findings.
5. Leverage the report to validate existing scenarios or to develop new scenarios for traveller targeting.

To date, the first and second deliverables have been met. The Science and Engineering Directorate has an understanding of the API/PNR data elements and data structure and will further this work in collaboration with the National Border Operations Centre Directorate, which

will facilitate access to systems for historical resultant data. Work in support of Scenario-Based Targeting will also progress with access to systems in order to apply predictive models.

NEXT STEPS

As the final three milestone activities are still outstanding, the originally proposed timelines have been re-evaluated. The application of the initial predictive model to the data and analysis will occur by November 2014, with a preliminary report to be prepared by December 2014. Finally, Programs Branch will leverage the report to validate existing scenarios or to develop new scenarios for traveller targeting, as required, by March 2015.

Please note that I am available to discuss this issue at your convenience.

for Richard Wex, Vice-President
Programs Branch

24/9/14

ATTACHMENT

1. **2014-05-12 Briefing Note to the President: "Use of Predictive Analytics in Pre-Arrival Risk Assessment"**

MAY 1 2 2014

Canada Border Services Agency / Agence des services frontaliers du Canada

PROTECTED A / PROTÉGÉ A

CANADA BORDER SERVICES AGENCY
MAY 01

CBSA/ASFC-14-01630

ROUTING SLIP/BORDEREAU D'ACHEMINEMENT

ISTI#313

Name and Telephone Number/ Nom et numéro de téléphone	Initials and date/ Initiales et date	ACTION REQUIRED/ MESURE REQUISE: Action	Information
President/Président Luc Portelance		☐	☒
Executive Vice-President/ Premier vice-président Malcolm Brown	MAY 1 2 2014	☐	☒
Vice-President/ Vice-président Martin Bolduc		☐	☒
Associate Vice-President/ Vice-présidente associée Caroline Xavier	APR 30 2014	☐	☒
Vice-President/ Vice-président Maurice Chénier	M. Chénier	☐	☒
Associate Vice-President/ Vice-président associé Louis-Paul Normand		☐	☒
Vice-President/ Vice-président Richard Wex	21 4.	☒	☐
Acting Associate Vice-President/ Vice-président associé intérimaire Peter Hill		☐	☒
Director General/ Directrice générale Kristine Stolarik	KS		
Executive Director/ Directeur exécutif Barry Desormeaux			

Subject/Objet : Use of Predictive Analytics in Pre-Arrival Risk Assessment
Action/Mesure : For Information / Pour information
BF/AR : N/A

To provide an update on efforts to leverage predictive analytics technology to assist in pre-arrival risk assessment.

Consultations: Information Science and Technology Branch, Operations Branch, Programs,

Entrack : 2014-387

Canada Border Services Agency
Operations Branch, V.P.'s Office
APR 2 8 2014 18980
Agence des services frontaliers du Canada
Direction générale des opérations, Bureau du V.P.

CBSA VP/AVP - Programs Branch
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ASFC VP/VPD - Direction générale des Programmes

Canada

For information

USE OF PREDICTIVE ANALYTICS IN PRE-ARRIVAL RISK ASSESSMENT

For the President

PURPOSE

To provide you with an update on efforts to develop predictive analytics technology to assist in pre-arrival risk assessment.

ISSUE

Given the large volume of travellers and conveyances coming to Canada, the Canada Border Services Agency (CBSA) uses predictive analytics, an automated system that assists in improving risk assessment by reviewing large amounts of data to find trends and patterns that might otherwise go unnoticed.

BACKGROUND

The Agency's risk assessments rely on a host of intelligence information from past enforcement results.

If the trend indicates that a future arrival is high risk, then that arrival, either a shipment or traveller, would be targeted for a more detailed examination.

Predictive analytics encompasses advanced techniques that allow automated prediction based on machine learning with limited human intervention to find faint patterns of relationships in large and complex data sets, ultimately to make predictions of business interest. Because the analysis does not start with a specific hypothesis (e.g. travellers from a particular country are higher risk), the algorithms may identify trends that would not otherwise be apparent. In terms of border control, calculations can be performed on historical data to predict the relative probability of particular outcomes (e.g. resultant targets) from new data on incoming travellers and shipments.

Canada

The CBSA has previously worked towards developing predictive analytics; in 2009, the Harmonized Risk Scoring – Advance Trade Data Initiative implemented a hybrid risk scoring algorithm that enhanced the Agency's ability to identify and interdict high-risk shipments. More exploratory work was carried out between 2010 and 2013 using data to predict which shipments were most likely to be either referred by targeting officers or to be resultant.

STATUS

The Programs Branch and the National Targeting Centre of the Operations Branch are working closely with the Information, Science and Technology Branch (ISTB) to pilot predictive analytics for risk assessment at the CBSA. These efforts are currently focused on the traveller stream and will align with the full implementation of scenario-based targeting.

In order to apply the predictive model to the required data, it will be necessary to house this data in an accessible environment,

NEXT STEPS

Predictive analytics will continue to be developed throughout 2014:

- Finalize understanding of data elements and the structure of the data to develop a predictive model – June 2014
-
- Apply predictive model to the data and conduct analysis – August 2014
- Develop a report based on findings – September 2014
- Leverage report to validate existing scenarios or to develop new scenarios for traveller targeting – October 2014

Please note that I am available to discuss at your convenience.

Richard Wex, Vice-President
Programs Branch

for 23/4/14 :